DOCUMENT RESUME

ED 256 770 TM 840 492

AUTHOR	Coldeway, Dan O.; Spencer, Robert E.
TITLE	The Measurement of Attrition and Completion in Distance Learning Courses. Project REDEAL, Technical Report No. 8.
INSTITUTION	Athabasca Univ., Edmonton (Alberta).
PUB DATE	Oct 80
NOTE	27p.; Also sponsored by the Innovative Projects Fund, Advanced Education and Manpower. Table 2 contains small print.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Adult Education; *Distance Education; Dropouts; Foreign Countries; Higher Education; *Measurement Techniques; Predictive Measurement; Predictive Validity; *Research Problems; *Student Attrition
IDENTIFIERS	Athabasca University AB; *Measurement Problems

ABSTRACT

High rates of learner attrition from courses continue to plague distance education institutions. As educational researchers continue to examine the attrition/completion issue, many measurement problems emerge. Focusing on Athabasca University, Alberta, this paper, part of a series produced by Project REDEAL (Research and Evaluation of Distance Education for the Adult Learner), reviews measurement techniques and summarizes problems in measuring and describing student attrition/completion in distance learning environments. Two major problems are: (1) determining who should be counted as enrolled, and (2) defining the length of time a student is allowed from the start of a course until completion rates are calculated. A preliminary analysis of the validity of an "on track" rate function to predict completion rates indicates its potential for accurate determination of attrition/completion. However, resolving measurement problems will entail: (1) clearly defining measurement goals; (2) understanding learner motives; and (3) looking at attrition/completion from a broader perspective than the single course. (BS)

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ED256770

TECHNICAL REPORT SERIES

The Measurement of Attrition and Completion in Distance Learning Courses

Dan O Coldeway

Robert E. Spencer

REDEAL Technical Report #8

Project REDEAL

Research and Evaluation of
Distance Education for the Adult Learner

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October, 1980

Sponsored by

Innovative Projects Fund

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and

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Abstract

High rates of learner attrition from courses continue to plague distance educational institutions. As educational researchers continue to examine the attrition/completion issue, problems in the measurement of the phenomenon emerge. The present paper discusses the measurement problem connected with attrition/completion. A variety of measurement techniques are reviewed. Work attempting to predict attrition rates using learner rate of progress in courses is also presented and discussed.

The Measurement of Attrition and Completion in Distance Learning Courses

One of the biggest problems facing distance learning institutions involves the large number of learners who after enrolling, do not complete courses. Although statistically comparing learner attrition rates between distance learning courses and more traditional "classroom" based courses is difficult, if not impossible, the general feeling held by many persons involved in the delivery of distance learning is that attrition rates are higher there than in traditional courses, and represent a real problem with the distance learning concept (Duby and Giltrow, 1978; Orton, 1977).

Although understanding attrition/completion in distance learning environments has been identified as important (Harrington, 1977; Keegan, 1979), the difficulty in measuring the phenomeron is a problem in itself. Who do you count as originally enrolled, when do you count them, what is a successful course completion, and a variety of other questions emerge when attention is given to the attrition/completion problem. The problem is magnified further when attempts are made to compare attrition rates between distance learning institutions. Differing definitions of enrollments, differing entry requirements, changing policies over time, etc., all come together to convince even the most enthusiastic institutional researcher that such work is doomed to failure and frustration.

This paper is an attempt to summarize the problems of measuring and describing attrition/completion in distance learning environments. The focus is on the problem at Athabasca University. However, many of the

problems involved in measuring and discussing attrition/completion at Athabasca University represent the types of problems often encountered at other institutions.

Methods of Measuring Attrition/Completion Rates

Two methods of measuring attrition/completion have been used most commonly. They are the:

Total Enrollment Formula =

course completions/total enrollment x 100

and

National University Extension (NUEA) Formula =

course completions/total enrollment - total non-starts x 100

Both methods of calculation can be used on the same set of data if information regarding the total number of non-start learners is available. In that case the total enrollment formula would almost always produce the highest attrition rate. For example, in two studies both methods of calculating attrition/completion were used and revealed consistent differences:

a. Donehower (1968):

Total Enrollment Formula Range 18.7% - 63.8% completions

NUEA Formula 35.7% - 76.5% completions

b. Orton (1977):

Total Enrollment Formula Range 54.3% - 68.9% completions

NUEA Formula Range 78.0% - 85.8% completions

Taking the lowest percentage completion rates for both studies there is a difference between the total completion formula and the NUEA formula of between 17 to 24 percent, suggesting that approximately the percentage of learners are in the non-start group.

Problems With Measuring Attrition/Completion

The difference between the total enrollment formula and the NUEA formula points out some of the major problems with the measurement of attrition/completion. That problem, stated simply, involves determining who should be counted as enrolled in a given course. The total enrollment formula assumes that everyone who "signs up" (defined in most cases as those registering and paying tuition) should be counted as enrolled. Unfortunately, such a definition often results in shockingly high attrition rates, sometimes over 90%.

Because many learners who "sign up" are often reported as not engaging in any course-related activity (they never get started), many reports subtract these "non-starters" from the total enrollment figure before calculating completion rates. Although this generally improves the appearance of the completion/attrition rates, problems with defining what a "non-starter" is may prove difficult.

Orton (1977) defined non-starters as learners who cancelled their course registration before submitting assignments. Such a definition has several advantages. First, the learner, by his or her action, makes the decision regarding non-start status. This avoids guessing about whether the learner

was actually interested or working in the course. Second, learners who take the trouble to cancel their registration before doing any course assignments are clearly taking themselves out of the course. Although important questions can be raised about why people enroll and then cancel their enrollment, it is clear that in this case the person should not be considered as an official learner in the course in question. Finally, if the learners are clearly aware that they can cancel registration prior to handing in an assignment, those not cancelling their registration are most likely interested enough in the course to remain an "official learner". Even though many of these learners may still not engage in course-related work, not cancelling registration could be assumed to put them into a category more closely related to an official learner than those who do cancel.

Unfortunately, Orton's definition also suffers from several disadvantages. First, it assumes that all courses have assignments that are monitored in some way by the institution. It is highly unlikely that all courses share this characteristic, making it extremely difficult to compare attrition/completion rates between courses unless the assignment structure of the courses involved is clearly defined. Second, the time interval between enrollment and the first assignment or examination would be critical to the definition. In some courses learners could have worked on the course for some time and still cancelled registration prior to handing in an assignment or taking an examination. In contrast, other courses require learners to hand in assignments within the first few days of enrollment. Comparing

these courses to each other, using the non-start formula, may prove difficult. Finally, it is also highly probable that many learners never take the time to cancel their registration, although they never begin working in the course. General apathy and how well the learners understand the policies specifying cancellation of registration could significantly affect their behaviour with respect to cancellations and therefore the attrition/completion statistic (e.g. policies regarding tuition refunds, etc., would most likely have a direct impact on the cancellation of registration behaviour of learners).

The second major problem in the determination of attrition/completion rates involves the length of time the student is given from the start of the course until the completion rates are calculated. This is especially a problem in institutions which do not have fixed deadlines for course completion. Bradley and Lehmann (1975), measured attrition one year after original course enrollment and found 23.7% had completed, while 43.2% had withdrawn. However, 33% of the cohort group were still active in the course one year later. Reports from Athabasca University indicate a similar phenomenon (Shale, 1980). Coldeway, et. al. (1980) determined that students who complete courses generally take longer than the institutionally defined number of days allotted for course completion in both three and six credit courses at Athabasca University.

In many cases, the measurement of completion/attrition is like taking a statistical "snapshot" of the attrition problem at a particular point in time. Attrition rates may change from day to day as learners either suspend studies for a period of time and then eventually complete or withdraw

from the course. This problem is magnified in a continuous enrollment environment such as Athabasca University. In such a situation learners can enroll any day of the year and the requirements for course completion are totally flexible within general time guidelines. Measuring the attrition phenomenon in an environment like the continuous enrollment environment at Athabasca University requires that measurement wait an extremely long time in order for the cohort group to have ample opportunity to complete or withdraw from the course.

There are other problems with the delayed time-to-measure-completion/attrition that effect the usefulness of measurement. One of these is that by the time the student cohort group has completed or withdrawn from the course and accurate statistics can be calculated, the course has been changed, revised, updated or outdated and the statistics prove to be somewhat irrelevant to more current problems. In order to avoid this problem many educational researchers have attempted to develop methods for predicting completion rates based on the behaviour of students within courses. Table 1 shows a hypothetical example of various ways to calculate attrition/completion at a given point in time using two hypothetical courses: Course A and Course B. One hundred students originally enroll in each course. The first column indicates the total number of students who completed the course on the date at which the table was generated. In this case, Course A had ten students who had totally completed the course, while Course B only had five. The second column indicates the number of students who had withdrawn from that course at that same point in time. Twenty from Course A and 30 from Course B. The

fourth column shows the difference between the total enrollment and the total completed plus the total withdrawn resulting in Course A with 70 students still active and Course B with 55 students still active. Thus far in the table the information only reflects the actual completion or withdrawal rates of students within the course. Column 4 is where the prediction begins: as shown in the bottom of Table 1, "on track" is defined as a function of the total number of students enrolled minus the total already completed plus those withdrawn. The function suggested is applied to this total and uses rate to determine the function result, (i.e. all learners who have completed assignments or exams at a particular base rate). For example, at Athabasca University, the University recommends that learners complete courses at a rate of one credit per two months. That rate function can be used to determine the number of learners who are "on track". In Course A, 30 out of the 100 total students are working at a rate commensurate with the rate specified by the institution. In Course B only 10 of 100 students are working at that rate.

The final column in Table 1 reflects the total predicted completion rate taking into consideration both the total number of learners completed and the total number of learners on track (i.e. the sum of the two numbers together form the total predicted completion rate for the course). As seen in Table 1, Course A with 30 learners on track and 10 learners already completed would have a predicted completion rate of 40%, in comparison to Course B which has only five learners completed and 10 learners on track, with a 15% predicted completion rate.

Table 1 goes about here

Although the "on track" prediction method for determining attrition/completion has many advantages it also suffers from several disadvantages. For example, many learners seem to be sporadic in their performance in distance-delivery courses. The rate function may not work when learners study in bursts rather than at a continued steady rate. These people would be eliminated from the completion prediction total by the rate function if their bursts of performance were near the end of the institutionally defined time period. The predicted completion rate concept may also suffer from a lack of face validity when it is used as a means to improve course procedures or course materials. Since the error rate associated with any prediction is variable, many people often assume that a low predicted completion rate is much too pessimistic and they anticipate better performance on the part of their learners. Only after a considerable interval of time has elapsed, can the accuracy of the prediction rate be determined.

Validating the Prediction Method

In an effort to determine whether a rate function could accurately predict completion rates, six courses delivered at Athabasca University were selected and the rate function applied to learners enrolled in those courses before the end of the institutionally defined course term elapsed (nine months into the six credit courses and five months into the three credit courses).[1] Predicted completion rates were determined using the

number of learners already completed plus the number of learners who met the rate function described below:

Learners were considered "on track" if they had completed work at a rate defined as follows:

a. The month of the date the learner enrolled (M1) was not counted.
b. The two following months (M2 and M3) were waived (not counted).
c. The first credit examination was expected sometime during the following month (M4) for the learner to be considered "on track".
d. The second credit examination was expected sometime during the sixth month (M6) for the learner to be considered "on track".
e. The third credit examination by the eighth month (M8), etc.

For courses having four credit examinations for the 12 month period (Psychology 206) rather than six (one per credit), the procedure would be modified accordingly - three months per credit examination. A learner was considered "not on track" at the time of compilation if the last credit examination that they passed was not recorded by the time indicated in the above procedure.

The two month waiver was included to make allowances for variations in mailing time and official start dates. For some learners then, this procedure resulted in more time to complete credits than that given the University schedule. In this sense, the "on track" rate was somewhat liberal.

In order to determine the predictive validity of the "on track" measurement function, completion data for the same courses was also collected long after most learners were expected to have completed the course:

Three credit courses - 16 months

Six credit courses - 20 months

A comparison of the "on track completion rates and the completion rates obtained at 16 and 20 months are shown in Table 2. In almost all cases predicted rates were close to completion rates obtained several months later. The reliability co-efficient representing the predictive validity of the rate function was 89.7%, indicating that the rate function was an excellent predictor of course completion rates.

The results of the above analysis would indicate that course attrition/completion can be accurately measured without waiting long periods of time from the original date of learner enrollment. The results would also suggest that prediction completion based upon rate of progress in the course is a rather conservative prediction, with all predicted completion rates in the courses sampled being equal to or lower than completion rates obtained several months later. Although additional work with predicting course completion rates must occur using a variety of courses in order to ensure the validity of prediction based upon rate of progress, it appears that such a prediction measurement formula may have utility.

Potential Solutions to the Attrition/Completion Measurement Problem

Define the Goals of Measurement. Descriptive statistics can be put to many uses. In many important ways, the complexity of the measurement system used depends largely upon the eventual use of the data generated.

Table 2 goes about here

For example, completion/attrition statistics can be used in a variety of ways. Institutions often require that information for economics and political reasons. Learner success, as measured by course completion, is often described by institutions as they argue for more funds, expanded program mandates, etc. Unfortunately, the type of data required by institutions as defined above is usually not as sophisticated as the type of data required by educational researchers and developers who require such information in order to improve learner completion rates and understanding attrition in more detail.

In order to generate the information necessary to understand the attrition phenomonon in enough detail to make meaningful suggestions for instructional change, complex measurement systems must be put into place. Measuring learner behavior on a frequent basis, predicting the probability of learner completion rates, and attempting to correlate learner characteristics with the probability of course completion will require relatively complex measurement systems. If understanding attrition/completion in enough detail to make recommendations for institutional change is the goal measurement, the measurement process must be designed specially to allow such information to be collected and processed.

Understand Attrition/Completion from the Learner's Perspective. In the measurement of attrition/completion every attempt should be made to understand the motives of learners who: a) complete courses; b) withdraw from courses; c) continue studying but never complete courses, and; d) continue in courses for long periods and eventually complete. A more detailed picture

of attrition/completion may emerge as information on the performance of learner sub-groups is obtained. Such information may also make it possible to describe the non-start problem in more detail, suggest alternate instructional strategies for various sub-groups of learners, and develop more complete definitions of success that go beyond simple rates of completion and attrition.

Understand Attrition/Completion from a Broader Perspective than the Single Course. In many cases it is important to consider attrition/completion rates between courses and within programs. Again, various sub-groups may have different patterns of program attrition. For example, degree seeking learners may demonstrate higher completion rates as they progress through programs of study in comparison to other sub-groups. Determining the relationship between sub-groups status and attrition/completion should give the researcher a much better picture of the patterns of learner behaviour in courses and the predictive validity of various measures of attrition/completion. Such information should also contribute significantly to both courses and program planning.

Are High Attrition Rates a Problem?

Drop-outs from adult education programs and other innovative post-secondary educational programs are not a new phenomenon. Thomas Pole (1816) described drop-outs from adult education as an "old story". The problem of drop-outs from adult education continues to be flagged as important in the literature (Boshier, 1978). However, it is not clear who is impacted by high

attrition rates in distance education. For the educational administrator high attrition rates may have political overtones. Funding for the continuation of programs and the mandate to start new programs may be tied to the existing performance levels of learners. High attrition rates in that sense may prove to be a tremendous political hurdle. In many cases the problem is masked rather than dealt with directly, as dealing with the problem directly is almost impossible from the administrators' position. Attempts at artificially inflating completion rates to reflect better learner performance may be symptomatic of the political pressure new and innovative educational programs experience in describing their efforts to reach learners of all types. Unfortunately, political pressure rarely exerts the force necessary to understand the measurement problem in detail. Instead, attention is given to determining better ways to describe the existing problem and make it appear more palatable. Since arm chair interpretation of completion rates is relatively easy to do and almost irrefutable because of the typical lack or age of existing data then it often impedes rather than enhances the institution's opportunity to solve a problem that may contribute to further attrition rate problems.

High attrition rates are often described as a problem for "the student". Many people in distance educational programs feel that somehow high attrition rates reflect a lack of service on the part of the institution and therefore should be corrected for the student's benefit. Unfortunately those concerned for the student may not be in a position to use attrition/completion statistics to make changes that will significantly reduce the attrition

problem. Even tutors who have direct contact with students have been shown not to be effective in reducing attrition rates in courses, even when paid directly to do so (Coldeway, 1980).

In many ways the measurement of attrition/completion is a problem primarily for the educational researcher. That is, the researcher's first allegiance should be to understanding the phenomenon under study in as much detail as is needed to produce valid and useful information. Should this information eventually prove useful to the improvement of the educational system, so much the better. However, if this information is not valid, accurate, or well-kept, it is doubtful that any useful information in the change of educational institutions and procedures will be made.

The problem of attrition/completion always raises another problem connected with measurement. That is, what to measure? So far, in this paper the discussion of measurement has focussed largely on credit completions or work assignments specified in a course in which attrition/completion is being addressed. Although many agree that the completion of courses and the acquisition of credits does reflect some level of success on the part of the learner, it can also be argued that adults enter educational courses and programs for purposes other than obtaining credits and completing assignments. A definition of success in many adult learning environments should be carefully considered and the educational researcher should strive to measure success using measurement schemes that do not involve credit or course completions. It is entirely possible that some proportion of students who do not complete

courses and perhaps do not even complete assignments and exams do feel that they have gained something and are successful as a result of their participation in the course. Although this type of student is often presented as a problem with attrition/completion statistics the phenomenon is rarely measured carefully and very little discussion occurs about the proportion of these students that make up the total sample.

Although high attrition rates are generally viewed negatively, it is possible to view a high rate of withdrawal from courses and programs as a positive outcome of open and flexible post-secondary education. Simply giving a wide variety of adults an opportunity to sample more structured and formal educational activities in their lives can be viewed in a positive light.

Admission requirements, costs, distance, time and institutional bureaucracy may all work together to prevent a variety of people from having the experience of trying and participating in educational programs. Allowing people the experience of enrolling in courses may be a step in the right direction. These same learners may go on to find courses and program at other institutions or in less structured educational activities that give them what they need. The fact that they are part of the attrition statistic may have been a step in the direction of achieving their own personal goals. Unfortunately, the number of students who would fit in this category is largely unknown and institutions appear unprepared to discuss the importance of this

type of student in an innovative post-secondary education program. Moreover, in many institutions, innovative or not, that student may not be viewed as desirable. Therefore, success from the student's perspective may differ considerably from success given the institutions's perspective.

In summary, this paper has attempted to describe the problems connected with the measurement of attrition/completion, especially as those problems relate to distance educational institutions. The importance of careful measurement and a clear definition of the purposes of measurement should not be overlooked. The potential predictive measurement attrition/completion represents, given preliminary results indicating that predictive measurement can be accurately used for "on-line" determination of attrition/completion within courses is apparent. However, more work in this area will be needed to determine the utility of such measures.

References

Boshier, R. Relationship between motives for participation in and dropout from adult education. Psychological Reports, 1978, 43, 23 - 26.

Bradley, A. P. & Lehmann, T. Attrition at a non-traditional institution. Saratoga Springs: State University of New York, Empire State College, 1975.

Coldeway, D. An examination of tutor management strategies for use in distance education (REDEAL Research Report #2). Edmonton: Athabasca University, 1980.

Coldeway, D., MacRury, K., & Spencer, R. Distance education from the learner's perspective: The results of individual learner tracking at Athabasca University (REDEAL Research Report #10). Edmonton: Athabasca University, 1980.

Donehower, G. M. Variables associated with correspondence study enrollments at the University of Nevada, 1963 - 1965. Unpublished master's thesis, 1968.

Duby, P. & Giltrow, D. Predicting student withdrawals in open learning courses. Educational Technology, February, 1978, 43 - 46.

Harrington, F. H. The future of adult education. San Francisco: Jossey-Bass, Publishers, 1977.

Keegan, D. J. Dropouts at the Open University. Unpublished manuscript, Boston: Northwestern University, 1979.

Orton, L. J. Completion and non-start rates in correspondence courses. Canadian Journal of University Continuing Education, 1977, 4.

Shale, D. Course completion rates. Edmonton: Athabasca University, Office of Institutional Studies, August, 1980.

Footnote

[1]Athabasca University assumes most learners will complete six credits in 12 months and three credits in six months. Courses offering credit values other than three and six are generally not available.

Table 1

Various Methods of Measuring Completion/Attrition Prior to all Learners in the Cohort Group Completing the Course

	Total Enrolled	Total Completed	Total Withdrawn	Total Still Active	Total On Track[1]	Total Predicted Completion Rate
Course A	N = 100	N = 10	N = 20	N = 70	N = 30	40%
Course B	N = 100	N = 5	N = 30	N = 55	N = 10	15%

[1]On track = f(total N - (completers and withdrawals))

f(all learners who have completed assignments or exams at a fast rate)

Table 2

A Comparison of Predicted Versus Actual Completion Rates

Course	Total Enrollment	% Completed at Nine Months	Predicted Rate at Nine Months	% Completed at 20 Months	% Completed at 5 Months	Predicted Rate at 5 months	% Completed at 20 Months
206	78	14%	35%	35%	--	--	--
207	6	0%	17%	17%	--	--	--
210	48	0%	8%	13%	--	--	--
216	81	7%	17%	20%	--	--	--
228	27	--	--	--	0%	26%	30%
232	151	--	--	--	1%	11%	13%
		A	B	C	D	E	F

Predictive Reliability = 89.7%

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